

IN THE CLAIMS

The listing of the claims below replaces all previous listings of the claims.

1. (Previously Presented) A speech communication apparatus for bi-directional speech communications, comprising:

a speaker;

a microphone;

a transmission-speech signal generation filter for manipulating a frequency characteristic of an output of the microphone to minimize a proximity effect produced in the output of the microphone, where the resulting signal output from the transmission-speech signal generation filter is a transmission-speech signal;

a pseudo-proximity-effect filter for applying a pseudo proximity effect on the transmission-speech signal output by the transmission-speech signal generation filter;

background sound level measurement means for measuring a power level of background sound by subtracting the power of the output of the pseudo-proximity-effect filter from the power of the output of the microphone;

transmission means for transmitting speech to be transmitted which has been extracted by the transmission-speech signal generation filter; and

received-speech clarifying means for adjusting a gain for a received-speech signal based on the power level of the background sound measured by the background sound level measurement means, wherein the received speech signal is transmitted to the speech communication apparatus for output by the speaker and comprises speech that is not received from a user of the speech communication apparatus;

wherein the speech communication apparatus does not comprise more than one microphone.

2. (Previously Presented) The speech communication apparatus of claim 1, further comprising:

received-speech-level measurement means for measuring a level of the received-speech signal at each predetermined frequency band,

wherein the background sound level measurement means measures the level of the background sound in each predetermined frequency band and the received-speech clarifying means performs loudness compensation in which the gain for the received-speech signal is adjusted in each predetermined frequency band such that received speech output by the speaker is heard at almost the same intensity in the human auditory sense irrespective of the level of the background sound, and the resultant signal is output to the speaker as the received speech.

3. (Original) The speech communication apparatus of claim 1, wherein the speech communication apparatus is a portable, mobile telephone for performing the speech communications by radio communication.

4. (Cancelled)

5. (Previously Presented) The speech communication apparatus of claim 1, wherein the microphone is a unidirectional or bi-directional microphone.

6. (Cancelled).

7. (Previously Presented) The speech communication apparatus according to claim 1, wherein the speech communication apparatus is a portable, mobile telephone for performing the speech communications by radio communication.

8. (Previously Presented) A speech communication apparatus comprising:
a speaker;
a microphone;
a background sound microphone;
a transmission speech filter operable to reduce a level of a lower frequency component of an output signal from the microphone;
an adaptive filter operable to estimate speech signals from the background sound microphone;

an adder operable to subtract the estimated speech signal from the output of the background sound microphone;

a background sound level calculator operable to calculate a level of a signal outputted from the adder and a level of the background sound;

a background sound level filter operable to minimize proximity effect; and

a received speech clarifying filter operable to adjust a gain for received speech to be output by the speaker based on the background sound level, wherein the received speech is transmitted to the speech communication apparatus for output by the speaker and comprises speech that is not received from a user of the speech communication apparatus.

9. (Previously Presented) The speech communication apparatus of claim 8, further comprising:

transmission means for transmitting an output of the transmission-speech filter as a transmission-speech signal from the speech communications apparatus.

10. (Previously Presented) A speech communication apparatus for bi-directional speech communications, provided with a handset having at a front face a speaker for outputting received speech and a transmission-speech microphone for collecting speech to be transmitted, the speech communication apparatus comprising:

a background-sound microphone disposed at the rear face of the handset at almost the same height as the speaker, for collecting background sound;

a transmission-speech signal generation filter for manipulating a frequency characteristic of an output of the background-sound microphone to minimize a proximity effect produced in the output of the background-sound microphone, where the resulting signal output from the transmission-speech signal generation filter is a transmission-speech signal;

a pseudo-proximity-effect filter for applying a pseudo proximity effect on the transmission-speech signal output by the transmission-speech signal generation filter;

background sound level measurement means for measuring a power level of background sound by subtracting the power of the output of the pseudo-proximity-effect filter from the power of the output of the background-sound microphone;

transmission means for transmitting speech to be transmitted which has been extracted by the transmission-speech signal generation filter; and

received-speech clarifying means for adjusting a gain for received speech based on the power level of the background sound measured by the background sound level measurement means, wherein the received speech is transmitted to the speech communication apparatus for output from the speaker and comprises speech that is not received from a user of the speech communication apparatus.

11. (Previously Presented) The speech communication apparatus of claim 10, wherein the background-sound microphone is a unidirectional microphone.

12. (Cancelled).

13. (Original) The speech communication apparatus of claim 10 wherein the speech communication apparatus is a portable, mobile telephone for performing the speech communications by radio communication.

14. (Previously Presented) A speech communication apparatus for bi-directional speech communications, comprising:

a speaker for outputting received speech that is transmitted to the speech communication apparatus;

a microphone for collecting speech to be transmitted;

background sound level measurement calculator operable to measure a level of background sound; and

a received-speech clarifying section operable to adjust a gain for the received speech to be outputted by the speaker based on the level of the background sound measured by the background sound level measurement calculator, wherein the received speech that is transmitted to the speech communication apparatus to be

outputted by the speaker comprises speech that is not received by a user of the speech communication apparatus;

the background sound level measurement calculator comprising:

a delay section operable to delay an output of a first background-sound microphone by a period of time corresponding to a delay time between transmission speech mixed into the output of the first background-sound microphone and transmission speech mixed into an output of a second background-sound microphone,

an adaptive filter operable to estimate transmission of speech mixed into the output of the delay section,

an adder operable to subtract the transmission speech estimated by the adaptive filter from an output of the delay section, and

a background sound level calculation section operable to calculate a level of an output of the adder and for outputting the result as the level of the background sound.

15. (Previously Presented) The speech communication apparatus of claim 14, wherein the adaptive filter estimates the transmission speech based on a difference between the output of the delay section and the transmission speech estimated by the adaptive filter.

16. (Previously Presented) The speech communication apparatus of claim 14, further comprising;

a received-speech-level measurement section operable to measure, at each predetermined frequency band the level of a received-speech signal received in the speech communications,

wherein the background sound level measurement section measures the level of the background sound in each predetermined frequency band, and the received-speech clarifying section performs loudness compensation in which the gain for the received-speech signal is adjusted in each predetermined frequency band.

17. (Original) The speech communication apparatus of claim 14, wherein the speech communication apparatus is a portable, mobile telephone for performing the speech communications by radio communication.

18-20. (Cancelled).

21. (Previously Presented) A speech communication apparatus for bi-directional speech communications, comprising:

a speaker;

a microphone;

a transmission-speech signal generation filter for manipulating a frequency characteristic of an output of the microphone to minimize a proximity effect produced in the output of the microphone, where the resulting signal output from the transmission-speech signal generation filter is a transmission-speech signal;

a pseudo-proximity-effect filter for applying a pseudo proximity effect on the transmission-speech signal output by the transmission-speech signal generation filter;

background sound level measurement means for measuring a power level of background sound by subtracting the power of the output of the pseudo-proximity-effect filter from the power of the output of the microphone;

transmission means for transmitting speech to be transmitted which has been extracted by the transmission-speech signal generation filter; and

received-speech clarifying means for adjusting a gain for a received-speech signal based on the power level of the background sound measured by the background sound level measurement means, wherein the received speech signal is transmitted to the speech communication apparatus for output by the speaker and comprises speech that is not received from a user of the speech communication apparatus.